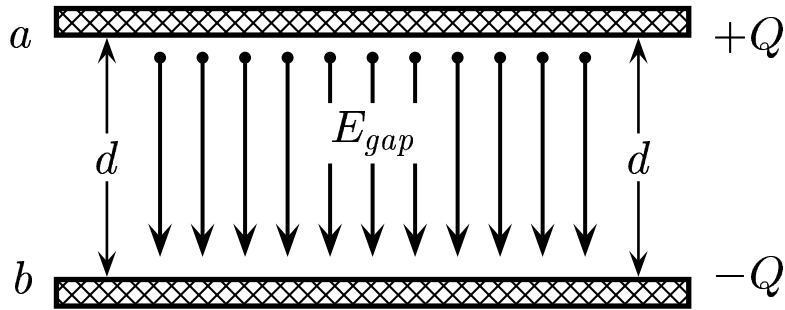


A parallel plate system has a plate charge  $Q$ .

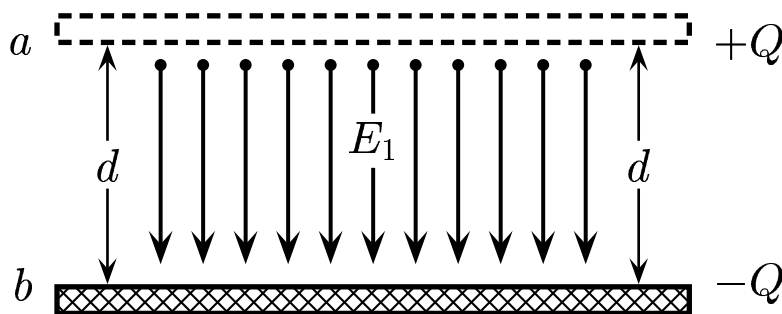
Within the gap  $E_{\text{gap}} = \frac{\sigma_{\text{plate}}}{\epsilon_0} = \frac{Q}{\epsilon_0 A}$ .



Determine electric force  $F$  with which the bottom plate pulls the top plate.

- A)  $F = Q E_{\text{gap}}$   
 B)  $F = \frac{1}{2} Q E_{\text{gap}}$

The electric field due to the bottom plate as shown is



$$E_1 = \frac{Q_{\text{encl}}}{2 \epsilon_0 A} = \frac{E_{\text{gap}}}{2}. \text{ This leads to } F = Q E_1 = \frac{Q E_{\text{gap}}}{2}$$

Answer **B**.